

Translation of a statement dated 29th March 2004
From Freischem
To the European Patent Office
Re PCT/EP03/02859
Our ref: M63PC011
IMB + FRINGS WATERSYSTEMS GMBH et al

IN ADVANCE BY FAX
Fax No: 089/23994465

Reference is made to the Official Letter of 1st December 2003:

The applicants lodge herewith an amended claim 1 which is to replace the claim as previously on file. Claims 2 to 20 as originally filed are being pursued.

It is requested that a positive International Preliminary Examination Report be drawn up on the basis of the claims now attached. If the authority dealing with international examination should not be able to consider the claims as being in a suitable condition for grant, we ask the Examiner for a

telephone interview

with the undersigned.

1. Disclosure of amended claim 1

Amended claim 1 corresponds to claim 1 as originally filed. The classifying portion of amended claim 1 has only been amended by incorporating the feature from the characterising portion of claim 1 as originally filed, that the suspension is filtered through at least one filter of a cross-flow filtration installation.

2. Novelty of the independent claims

As the independent claims which are now the subject of the present proceedings are basically identical to the independent claims as originally filed, the subjects of the independent claims now on file are also novel having regard to DE-A-100 01 493 (referred to hereinafter as D1), US-A-5 385 671 (referred to hereinafter as D2) and US-A-4 865 744 (referred to hereinafter as D3). That has already been established in the written report in section 2 so that this will not be further discussed at this juncture.

3. Inventive activity

Unlike the authority dealing with international preliminary examination, the applicants however take the view that the subjects of amended claim 1 and claim 20 are based on inventive activity. As claim 20 is based on amended claim 1, the submissions set out hereinafter in respect of amended claim 1 apply both in respect of the subject-matter of amended claim 1 and also the subject-matter of claim 20.

3.1. Subject-matter of claim 1

In accordance with amended claim 1, claimed therein is a method of producing a metal hydroxide, in particular magnesium hydroxide, from a salt solution, having the following features:

- a) a metal is firstly precipitated from the salt solution;
- b) the salt solution-bearing suspension produced in that way is then filtered through at least one filter of a cross-flow filtration installation; and
- c) a permeate produced by filtration of the suspension is fed to the cross-flow filtration installation again.

3.2. Most relevant state of the art

D1 is deemed to be the most relevant state of the art. That citation discloses a method of producing a metal hydroxide in the form of magnesium hydroxide from a salt solution. Firstly the metal is precipitated from the salt solution (feature a). The salt solution-bearing suspension produced in that way is then filtered through a filter of a cross-flow filtration installation (feature b).

Unlike the method according to the invention which is claimed with amended claim 1 it is not known from D1 that a permeate produced by filtration of the suspension is fed to the cross-flow filtration installation again (feature c).

The invention therefore has the advantage over document D1 that recycling of the permeate into the cross-flow filtration installation ensures ever recurring purification of the metal hydroxide-bearing solution with the permeate which becomes more and more salt-free so that troublesome foreign substances or impurities in any concentration can be separated from that solution (thus also as stated on page 2, lines 25 to 30 of the originally filed specification).

Upon the precipitation of magnesium hydroxide, a very bulky and greasy deposit is produced, which in further known methods is separated off or squeezed out by way of filter presses. By virtue of that high-volume nature of the deposit it can already become puncture-proof from a 20% solid proportion, depending on the surface area produced. For further purification purposes the above-mentioned slimy deposit is repeatedly stirred up with washing water a plurality of times and separated off or squeezed out again by

way of filter presses. That known purification procedure is very expensive. In addition, by virtue of the high-volume structure of the deposit it also does not result in the levels of purity which are required for demanding uses (for example in pharmacy). That is due to the fact that the high-volume structure of the deposit forms water inclusions which cannot be readily washed out by the washing procedure itself as those water inclusions are only accessible by way of time-intensive diffusion processes. Rather, those water inclusions are still further consolidated by virtue of the separation or squeezing procedure so that again stirring it up with fresh washing water results in a reduced purification effect.

The invention in contrast enjoys the advantage that it avoids the formation of those inclusions (which are typical of deposits precipitated in bulky form). The invention is based on the consideration that the strongly turbulent flow conditions specific to cross-flow filtration installations provide that the filtration procedure acts as a mixing member so that dissolved foreign substances or impurities can be very uniformly washed out. The turbulent flow configuration prevents the formation of agglomerates in the suspension. The consequence of this is that the formation of water inclusions is also avoided, thereby achieving more efficient purification in comparison with the previously known methods. The fact that the permeate is fed or recycled to the cross-flow filtration installation provides for ever recurring purification of the solution containing the metal hydroxide, with a permeate which becomes more and more salt-free, so that troublesome foreign substances or impurities in any level of concentration can be separated from that solution.

3.3. Inventive activity over D1

In regard to D1 the subject-matter of the invention is based on inventive activity as the man skilled in the art, an engineer in the field of process technology, does **not** find feature c) in D1. In the method known from D1 and the apparatus thereof magnesium hydroxide is obtained from permeate by filtration of the magnesium hydroxide to be obtained and a further filtration operation. Accordingly the man skilled in the art also has no pointer to feature c).

3.4. Inventive activity over D1 and D2

Even when D1 is considered in conjunction with D2 the man skilled in the art will not come to a different conclusion.

D2 discloses a method of obtaining magnesium hydroxide from a mixture of particulate magnesium hydroxide and dissolved sodium sulphate in water. In that situation, that mixture is pumped from a tank through an ultrafiltration module so that the dissolved sodium sulphate passes through the membrane pores. In addition prior to being introduced into the ultrafiltration module the mixture is supplied with water at a flow rate which is substantially equal to the permeate flow rate. The permeate is discharged, unlike the present invention.

Thus the man skilled in the art does not find any pointer to feature c) which is still lacking, in D2. Therefore, in regard to joint consideration of D1 and D2, the invention is based on inventive activity.

3.5. Inventive activity over D1 and D3

The man skilled in the art also will not come to a different conclusion in regard to D1 and D3.

More specifically the man skilled in the art would not have referred to D3 at all for attaining the specified object. More specifically D3 concerns a continuous purification process for **dye** suspensions. The man skilled in the art does not see any connection between a dye suspension purification process and a method of producing metal hydroxide. More specifically, dye suspensions must be very readily suspendable and at high levels of concentration in respect of dyestuff particles in the solution there must always still be good flow properties. It follows therefrom however that dye suspensions **are not present in the form of high-volume deposits** which have a tendency to form the inclusions already described above. Rather, they are in the form of well-suspended particles which constitute no or only very few agglomerations. That however is not the case in regard to a high-volume deposit in respect of magnesium hydroxide. Here, agglomerates are formed which break up by means of the invention by virtue of the high turbulence involved and the re-formation thereof is prevented.

Accordingly the man skilled in the art would not have referred to D3 at all for the purposes of attaining the above-specified object. For that reason the invention is also based on inventive activity in regard to this aspect.

Dr Martin Tongbhoyai
Patent attorney

Enclosure:
Amended claim 1

Amended claim 1
M63PC011

1. A method of producing a metal hydroxide, in particular magnesium hydroxide, from a salt solution, wherein a metal is firstly precipitated from the salt solution and the salt solution-bearing suspension produced in that way is then filtered through at least one filter (3, 6-8, 13-17) of a cross-flow filtration installation (3, 6-8, 13-17), characterised in that a permeate produced by filtration of the suspension is fed to the cross-flow filtration installation (3, 7, 14-17) again.

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Amended claim 1

M63US011

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1. A method of producing a metal hydroxide, in particular magnesium hydroxide, from a salt solution, wherein a metal is firstly precipitated from the salt solution and the salt solution-bearing suspension produced in that way is then filtered through at least one filter (3, 6-8, 13-17) of a cross-flow filtration installation (3, 6-8, 13-17),

characterised in that

a permeate produced by filtration of the suspension is fed to the cross-flow filtration installation (3, 7, 14-17) again.

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